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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/649,086

08/26/2003

Steven J. Keating

042390.P6134D

4927

7590

07/28/2004

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EXAMINER

OWENS, DOUGLAS W

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/649,086

Applicant(s)

KEATING ET AL.

Examiner

Douglas W Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/26/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Specification*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2 and 4 – 8 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,197,668 to Gardner et al.

Regarding claims 1 and 2, Gardner et al. teach a microelectronic device (Figs. 1 – 2B, for example), comprising:

a semiconductor substrate (10); and

a dielectric layer comprising silicon oxynitride (Col. 3, lines 6 – 8; (30)).

With respect to the requirement of the silicon oxynitride being a nitridized-hydroxy-silicate layer, which is a reference to how the silicon oxynitride layer is formed, this is considered a product-by-process limitation. “Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of

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production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Although Gardner et al. does not teach forming the silicon oxynitride layer by a nitridized hydroxy-silicate layer, the product is identical to that of the claimed invention since the layer of the claimed invention and Gardner et al. is silicon oxynitride.

Regarding claim 4, Gardner et al. teach a microelectronic device, wherein the silicon oxynitride has a typical thickness of about 4 Angstroms, which is less than approximately 7 Angstroms (Col. 3, lines 33 – 34; Col. 4, lines 5 – 7).

Regarding claim 5, Gardner et al. inherently teach a microelectronic device, wherein the substrate comprises a silicon wafer since a silicon wafer is required for the manufacture of microelectronic devices of this type.

Regarding claim 6, Gardner et al. teach a microelectronic device, further comprising a gate electrode (32) over the silicon oxynitride layer.

Regarding claim 7, Gardner et al. teach a microelectronic device, further comprising a pair of source/drain terminals (16A, 18A) disposed in the semiconductor substrate, substantially adjacent to the gate.

Regarding claim 8, Gardner et al. teach a field effect transistor, comprising:

a gate electrode (32);

a pair of source/drain terminals (16A, 18A) disposed in a substrate, substantially adjacent the gate electrode; and

a gate dielectric (30) disposed between the gate electrode and the substrate, the gate dielectric comprising a silicon oxynitride layer (Col. 3, lines 6 – 8) having a typical thickness of about 4 Angstroms, which is less than approximately 7 Angstroms (Col. 3, lines 33 – 34; Col. 4, lines 5 – 7).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al. as applied to claims 1 and 2 above, and further in view of US Patent No. 6,013,582 to Ionov et al.

Gardner et al. do not teach a device, wherein the silicon oxynitride is a material in accordance with the expression  $\text{SiO}_x\text{N}_{(4-2x)/3}$  where  $0 \leq x \leq 2$ . Indeed, Gardner et al. is completely silent with respect to the precise composition of the silicon oxynitride material. Ionov et al. teach that silicon oxynitride typical has a composition of  $\text{SiO}_x\text{N}_y\text{H}_z$ , where x ranges from 0 to about 2, y ranges from 0 to 1 and z ranges from 0 to 1 (Col. 1, lines 55 – 58). If x were set at 1.5, for example, the expression  $(4-2x)/3$  would be 1, which lies within the range of y for a typical composition of silicon oxynitride. It would have been obvious to one of ordinary skill in the art to incorporate the typical silicon oxynitride composition taught by Ionov et al. into the device taught by Gardner et al.,

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since it is desirable to select a composition of silicon oxynitride that is known to be a reliable insulator.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Douglas W. Owens". The signature is fluid and cursive, with the first name "Douglas" being the most prominent part.

Douglas W. Owens  
Patent Examiner